LABORATORY FOR CHEMICAL TECHNOLOGY
Technology 125, 9052 Gent, Belgium

Coach	**Supervisor(s)**	**Funding**
Balamurugan Deivendran	Geraldine Heynderickx Vladimir Galvita Hilde Poelman	FWO-MACBED

Computational and experimental study of magnetically assisted fluidised beds (MAFB)

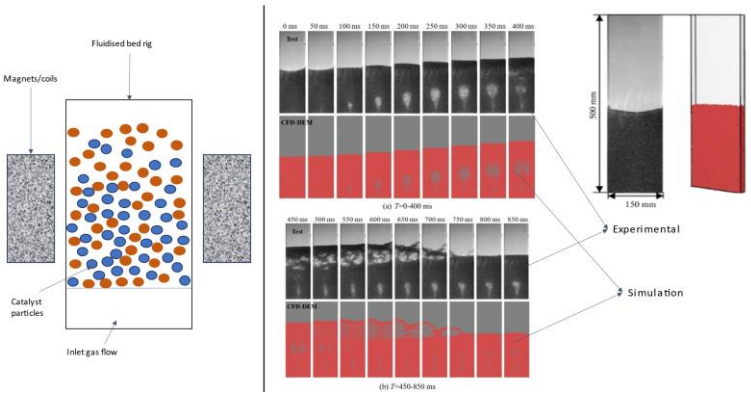
Aim

The aim of this work is to investigate the changes in hydrodynamics and heat transfer in a magnetically assisted fluidised bed reactor with multicomponent materials.

Justification

Fluidisation of nanoparticles and hard-to fluidise-materials is slowly becoming one of the most significant issues in chemical industry. Adding an external magnetic field to the unit is expected to enhance fluidisation, heat transfer and mass transfer characteristics of these particles and materials.

The aim of this work is to study experimentally and computationally the phenomena of fluidisation of particles, with variable density and magnetizability, without and in presence of an external magnetic field in a Magnetically Assisted Fluidized Bed (MAFB) unit. Several studies on the application of magnetic fields to a fluidised bed can be found, e.g., see Figure1[1], but only a limited number of these apply CFD-DEM modelling of MAFBs. Hence, there is ample room for both experimental and theoretical exploration.



Program

- literature survey on magnetically assisted fluidised bed reactors.
- idem on CFD(-DEM) modelling approaches for MAFBs.
- perform experiments with different particle types in the MAFB without and with magnetic field.
- model the effect of the magnetic field upon the fluidisation.
- Combine experimental and computational results to conclude on the magnetic effects upon fluidisation.

[1] Zhou L. et al. Energy Reports 8 2022, p2376.